



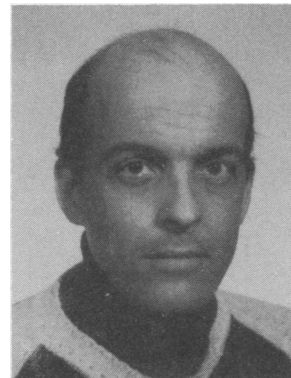
S. Orava

## OSTEOCHONDROSES IN ATHLETES

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### ABSTRACT

Osteochondroses are disorders of primary and secondary growth centres, or lesions at the apophyseal or epiphyseal growth areas of bones. Although there are many types of osteochondroses, the history, clinical symptoms and findings as well as radiological findings are typical. Physical exercise is one of the factors that provokes symptoms. In a series of 185 osteochondroses in active young athletes, there were 18 different disorders. The commonest were Osgood-Schlatter's disease, Sever's disease, osteochondritis dissecans of the femoral condyles, various other patellar osteochondroses and Scheuermann's disease. Most of the athletes were from individual events; track and field sports (53.5%), cross-country skiing (8.1%), gymnastics (3.2%) and power events (2.7%). Of the team sports soccer produced the most (20.0%). The treatment was conservative in 84.3% and operative in 15.7%. The duration of symptoms in these athletes persisted in about 43% for less than one year and in 57% for more. The late changes of osteochondroses do not cause serious risks for a normal life, if the treatment is active and the follow-up efficient.

**Key words:** Osteochondroses, Physical exercise, Overuse injury, Physical exertion.

### INTRODUCTION

The osteochondroses comprise a group of clinical syndromes with a certain common pathology and an uncertain aetiology (Siegel, 1968). Osteochondroses — osteochondritic lesions or aseptic (osteo) necroses — affect the primary and secondary growth centres, the apophyseal or epiphyseal areas of the bones or joints, as well as the joint cartilages of the skeleton (Beck and Soukup, 1972; Reichelt, 1971). Osteochondroses of different locations and types have many similarities concerning history, clinical course, and radiological findings (Ary and Turnbo, 1979).

The aetiology of the osteochondroses is still mostly unknown. There are, however, some factors generally recognised as aetiological factors, and physical activity is often said to be a common feature. It is not entirely known, whether the increased physical activity causes the symptoms or merely provokes them. Osteochondroses may be almost symptomless in physically inactive persons, but the symptoms may hamper athletic activity and cause trouble in everyday life (Orava, 1980; King and Blundell-Jones, 1981).

The purpose of this study was to investigate the incidence of osteochondroses among young athletes, the difference between sexes, and to consider the treatment of the conditions.

### METHODS AND PATIENTS

The patients were seen over a period of six years at a sports medical outpatient clinic (the Sports Clinic of Deaconess Institute of Oulu) and a central hospital (Keski-Pohjanmaa Central Hospital, Kokkola, Finland). 185 osteochondroses were seen in 178 athletes, all of which were followed up for at least one year, some up to 8 years.

There were 43 female and 135 male athletes in the series. All the patients were active, training regularly and competing. The mean age was 14.4 years (9-26 y), being 13.5 years for the girls and 14.8 years for the boys. The age and sex distribution is shown in Fig. 1.

The sports events of the patients are presented in Table 1. The majority of them were engaged in track and field athletics. 53 cases of the osteochondroses

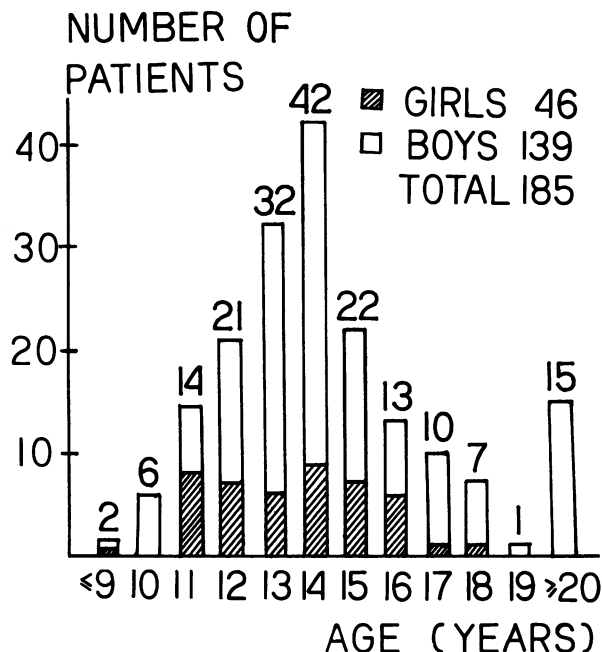


Fig. 1: Age and sex distribution of the athletes with osteochondroses.

(28%) occurred to athletes of team sports and 132 cases (72%) to athletes in individual sports. Endurance sports, such as middle and long distance running, cross-country skiing and orienteering caused 69 (37%) of the disorders. 116 (63%) of the disorders were connected with sports performances requiring successive sudden exertions, such as running, jumping, and throwing. Girls who mostly were interested in sprint events had

**TABLE I**  
Sports events of the athletes with osteochondroses in both sexes.

Sports Event	Girls	Boys	Total	Per cent
Track and Field				
Running events	27	48	75	40.5
Field events	7	17	24	13.0
Soccer	—	37	37	20.0
Cross-country Skiing	2	13	15	8.1
Power events (Wrestling, Judo, Karate, Boxing)	—	5	5	2.7
Gymnastics	5	1	6	3.2
Finnish Baseball	2	2	4	2.2
Ice Hockey	—	4	4	2.2
Volleyball	1	5	6	3.2
Orienteering	1	3	4	2.2
Basketball	—	2	2	1.1
Swimming	—	2	2	1.1
Figure Skating	1	—	1	0.5
<b>Total</b>	<b>46</b>	<b>139</b>	<b>185</b>	<b>100</b>

a relatively higher incidence of osteochondroses than had the boys in the same events.

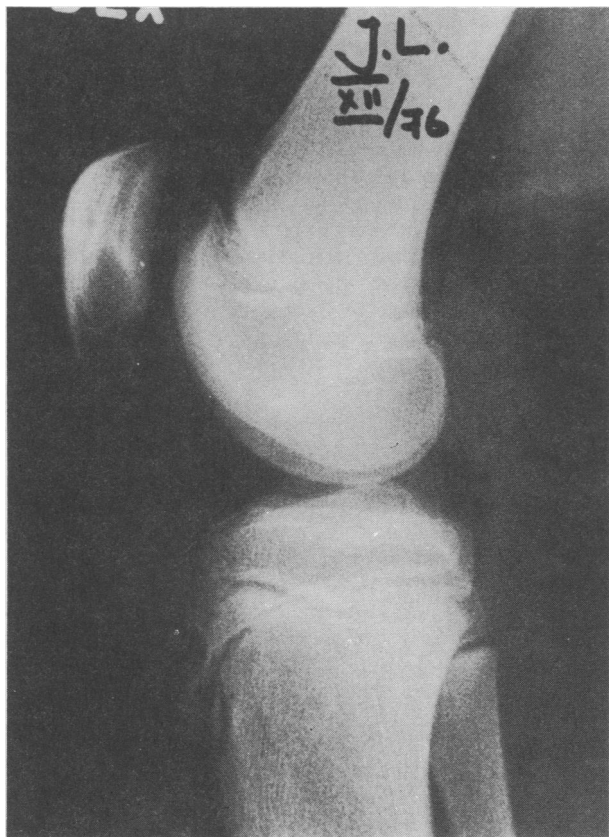
Diagnoses were made on the basis of history, subjective symptoms, clinical physical findings, and radiological or radio-isotope findings, and are presented in Table II. Osgood-Schlatter's and Sever's diseases were the most common in the series.

**TABLE II**  
The diagnoses of the osteochondroses in young female and male athletes.

Diagnosis	Girls	Boys	Total	Per cent
Osgood-Schlatter's Disease	17	39	56	30.3
Sever's Disease	6	36	42	22.7
Osteochondritis dissecans of the femoral condyles of knee	3	14	17	9.2
Scheuermann's Disease	1	13	14	7.6
Sinding-Larsen-Johannsen's Disease	3	9	12	6.5
Osteochondritis dissecans of patella	1	2	3	1.6
Bipartite patella with osteochondritis	1	2	3	1.6
Osteochondritis of the whole patella	—	1	1	0.5
Apophysitis of superior patellar margin	—	2	2	1.1
Apophysitis of anterior superior iliac spine	4	5	9	4.9
Apophysitis of anterior inferior iliac spine	—	3	3	1.6
Freiberg's Disease	5	3	8	4.3
Osteochondritis of symphysis	—	4	4	2.2
Apophysitis of ischial spines	3	1	4	2.2
Osteochondritis dissecans of talus	1	1	2	1.1
Osteochondritis dissecans of elbow joint	—	2	2	1.1
Iselin's Disease	1	1	2	1.1
Apophysitis of medial humeral epicondyle	—	1	1	0.5
<b>Total</b>	<b>46</b>	<b>139</b>	<b>185</b>	<b>100</b>

In most cases treatment was conservative consisting of rest from physical activity, physiotherapy, and medication by parenteral or topical analgesia or/and anti-inflammatory agents. In 29 cases (15.7%) the treatment was operative (Table III). There were 25 males (86.2%) and 4 females 13.8%) in this group.

The duration of symptoms is presented in Table IV. About one-third of the patients suffered from the symptoms for more than one year. Only slightly more than 20% of the cases lasted for less than two months, whereas the longest duration of symptoms was noticed in cases of Scheuermann's disease, osteochondritis



*Fig. 2: Osgood-Schlatter's disease in a 14-year-old track and field athlete. Osteolytic zone is seen in this case at the anterior tibial tubercle.*

**TABLE III**

**Operative treatment of osteochondroses in young athletes.**

Osteochondritis dissecans of femoral condyles of knee	13
Osgood-Schlatter's Disease	6
Freiberg's Disease	4
Osteochondritis dissecans of elbow	2
Osteochondritis dissecans of talus	1
Osteochondritis of symphysis	1
Osteochondritis dissecans of patella	1
Bipartite patella with osteochondritis	1
<b>Total</b>	<b>29 (= 15.7%)</b>
Girls	4
Boys	25

dissecans, and some cases of Osgood-Schlatter's disease.

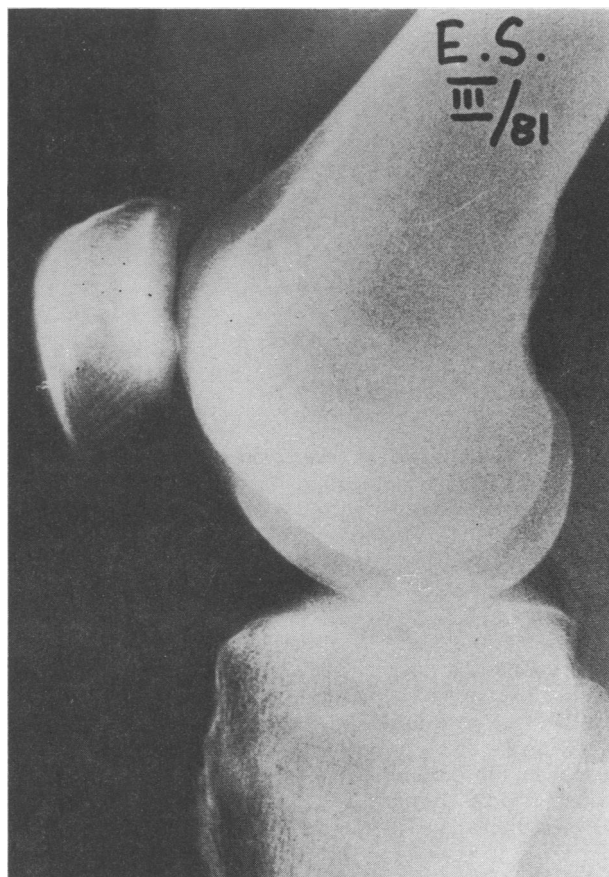
During the follow-up periods 16 of the patients

stopped their active sports career, both regular training and competition, but only a few of these adolescents had disabling symptoms in everyday life. Morphological, clinical, and radiological late changes were found in about 20% of the patients, but only a few of the

**TABLE IV**

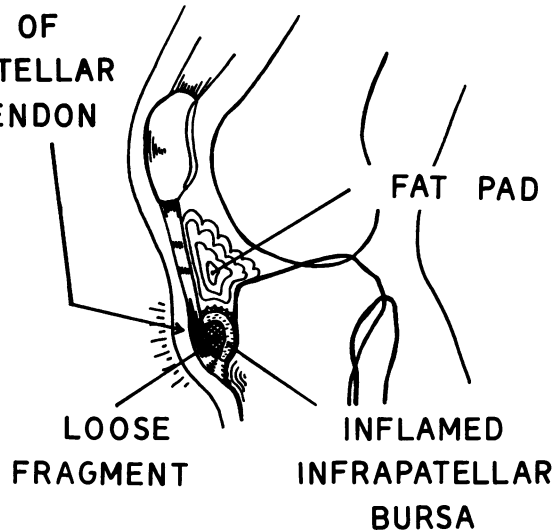
**The duration of the symptoms from osteochondroses in young athletes, expressed as percentages of the series.**

Less than 2 months	21.2
From 2 to 6 months	21.9
From 6 to 12 months	25.6
From 1 to 2 years	19.5
More than 2 years	7.6
Not known	4.3
<b>Total</b>	<b>100%</b>

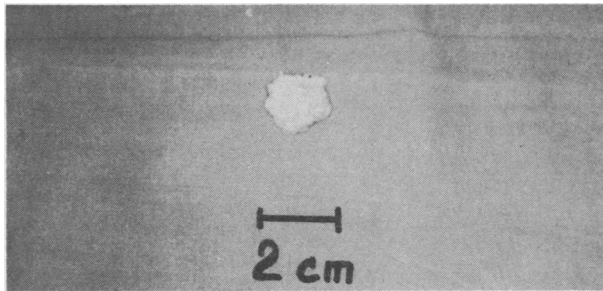


*Fig. 3: A. Late sequelae of Osgood-Schlatter's disease. A loose fragment at the tibial tubercle causes the symptoms in a 22-year-old soccer player.*

## DEGENERATION OF PATELLAR TENDON



*B. Schematic drawing of the same knee.*



*C. Excised loose fragment.*

changes were noted as severe; an uneven joint surface in some cases of osteochondritis and increased thoracic or thoracolumbar kyphosis following Scheuermann's disease. All other changes, such as a prominent tibial tuberosity after Osgood-Schlatter's disease, were without significance.

The lesions were bilateral in 44 patients (23.8%). There were 22 cases of bilateral Sever's disease (52.4%) and 17 cases of bilateral Osgood-Schlatter's disease (30.4%). Six athletes in the series had two different successive osteochondroses and were symptomfree between the diseases. Only one patient had two simultaneous osteochondroses, both Osgood-Schlatter's and Sever's disease.

## DISCUSSION

The diagnosis of osteochondroses is usually quite easy for physicians familiar with these problems. However, it may also cause difficulties and be delayed (Siegel,

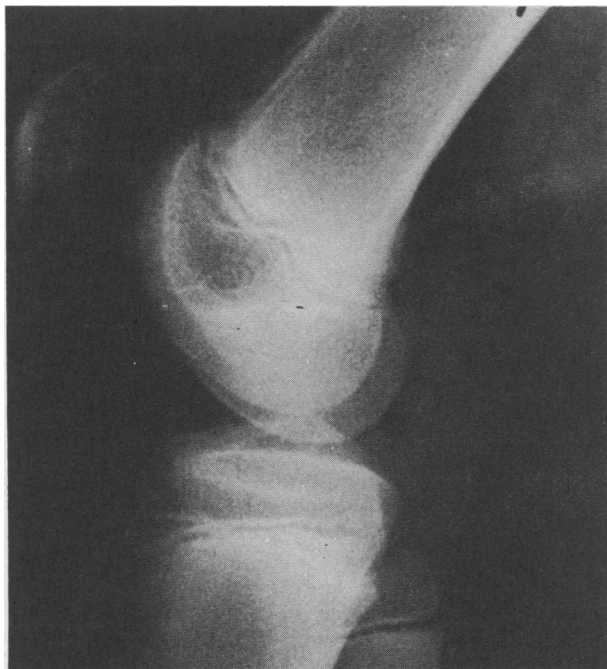
1968; Beck and Soukup, 1972; Koch and Jackson, 1981). This frequently happens to athletic children, who are much too often offered the diagnosis of "overuse injury", without a closer definition (Orava, 1980; Williams, 1981). Also, there is a group of athletes, who consult a doctor late or not at all, because the symptoms are so slight. A growing interest in sports medicine and the increased need of training throughout the year have made it easier for athletes to come to seek advice in time (Williams and Sperry, 1976; Orava, 1980). The "stress avulsions" occur near the apophysitis-osteochondroses and an avulsion fracture in a young athlete may occur after a very moderate trauma (Tomola, 1968; Devas, 1975; Orava and Ala-Ketola, 1977; Walther and Hähnel, 1980).

In athletic children the incidence of osteochondroses is not much different from that of the non-athletic. The incidence of osteochondroses among all overuse injuries seen in the 15-year-old and younger athletes was reported earlier by Orava and Saarela (1978) and Orava (1980) to be 37-40%. Among athletes of all ages with overuse injuries the incidence of osteochondroses was estimated to be about 3% per year. In the statistics of the outpatient clinic, the osteochondroses comprised 1.8% of all athletes' visits to the physicians.

The sex distribution of our series differs from the earlier ones in that the number of females is higher. Of the patients with Osgood-Schlatter's disease one-third were girls in the present series, whereas Reichelt (1971) reported relatively fewer female patients. Women are represented in statistics of overuse injuries more often than generally expected (Orava, 1980). In this material only Scheuermann's and Sever's diseases can be said to be clearly more typical in male athletes, as shown earlier by Orava and Weitz (1979).

In addition to the osteochondritis dissecans of the knee joint, athletes have these disorders also in the talocrural joint (Cavallaro et al, 1979; Hakimzadeh and Munzinger, 1979), and in the elbow joint (Gauer et al, 1979). In the present material there were three cases of osteochondritis dissecans of the patella, considered to be very uncommon (Orava et al, 1979). This condition has not to be confused with much more common disorders of the patello-femoral joint mechanics (Lancourt and Cristini, 1975; Orava, 1980). Traction apophysitis of the secondary maturation centres of the lower pole of the patella (Sinding-Larsen-Johannsen's disease) seems to be confined to young athletes, too. Among the rare osteochondroses there were 4 cases of osteochondritis of the symphysis pubis which have earlier been documented as specific to athletes (Williams and Sperry, 1976; Koch and Jackson, 1981).

The treatment of osteochondroses is mainly conservative. Sometimes, however, surgery is indicated, and may

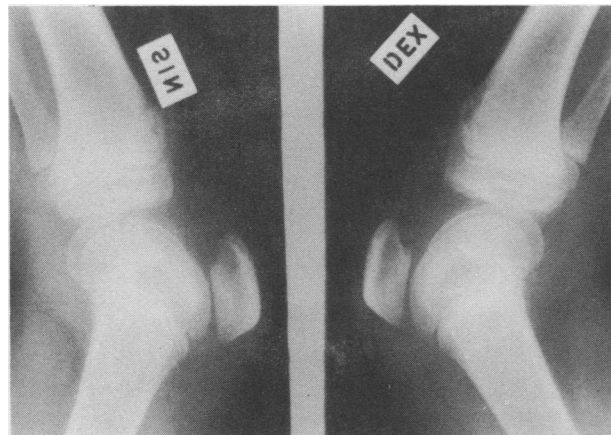


*Fig. 4: Sinding-Larsen-Johannsen's disease of patella in a 12-year-old runner. The lower pole of patella is osteolytic and irregularly fragmented.*

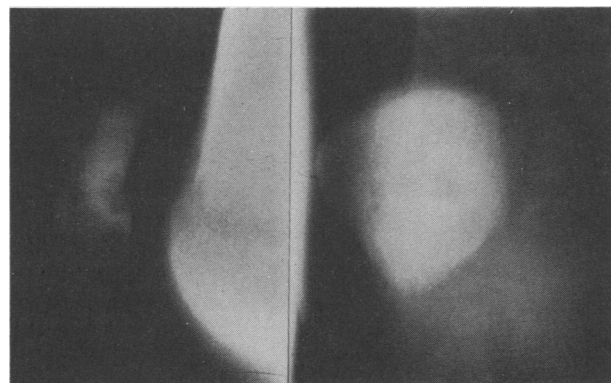
be the best treatment for selected cases. King and Blundell-Jones (1981) operated on about 30% of their patients with Osgood-Schlatter's disease. This disorder probably does not need operative treatment so frequently (Soren, 1968; Reichelt, 1971). In the present series 11% of the Osgood-Schlatter cases needed surgery. Athletes probably need surgery more often than other children. The series included three patients, who had symptoms of O-S's disease at the age of 13-14 years, but were not treated surgically until more than 20 years old, because of recurrent, chronic and increasing symptoms. The operative finding was a loose fragment at the tibial tubercle site with degenerative changes of the patellar tendon.

Although osteochondritis dissecans may heal spontaneously, active treatment, arthroscopy and/or arthrotomy with fragment fixation, are recommended to prevent the loose body formation leading to later osteoarthritis (Dexel and Doerig, 1979; Gauer et al, 1979; Hakimzadeh and Munzinger, 1979; Lindholm and Österman, 1979; Burge et al, 1980; Mann, 1980). In our series too, the treatment of these cases was active.

In Freiberg's infarctions excision of the affected metatarsal head was done with satisfactory results. In



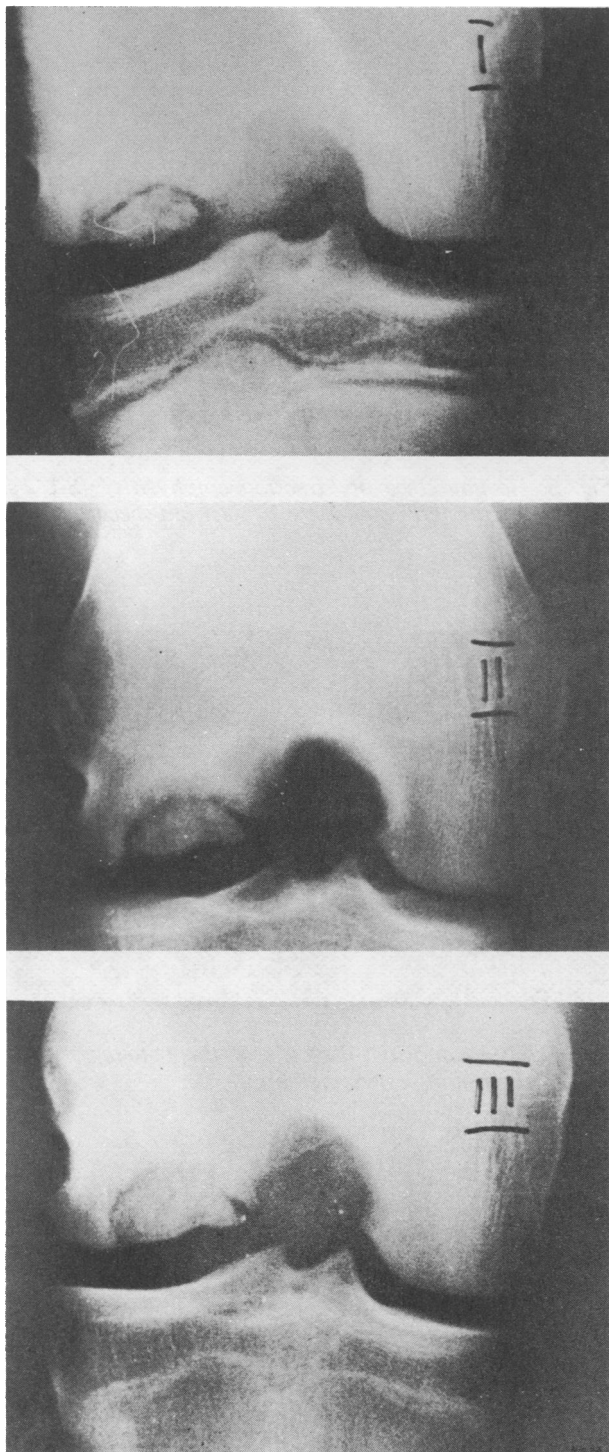
*Fig. 5: Healing stage of "traction epiphysitis" (S-L J's disease) of the left patella in a 12-year-old soccer player.*



*Fig. 6: Osteochondritis dissecans of the patella in a 17-year-old high jumper (tomography).*

other forms of osteochondroses the late sequelae are not so harmful, but close observation is needed in order to select the cases needing surgical treatment in time.

The osteochondroses did not cause permanent disability to the patients. In young athletes a sufficiently long rest from athletic activity may be needed. On the other hand, athletic exercises are recommended as one form of treatment of Scheuermann's disease (Brenke and Dietrich, 1979). Conservative treatment should be the first and most important line of treatment, surgery comes second. Children should have individual optimal amount and dosage of physical exercise in all sports events.



*Fig. 7: Big osteochondritis dissecans of the lateral femoral condyle in a 14-year-old sprinter. Healing stages without surgical treatment during 2 years (I-III).*



*Fig. 8: Calcaneal apophysitis (Sever's disease) in a 10-year-old track and field athlete. A. Side X-ray view. B. Antero-posterior view.*



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**THE PHILIP NOEL BAKER PRIZE – 1982**  
**AWARDED TO Prof. M. OSTYN, MD, of the Catholic University of Leuven, Belgium**



*Presentation of Noel-Baker Prize to Mr. Ostyn by E. Jokl (right).*

The International Council of Sport and Physical Education gives an award annually to a scientist distinguished in the application of science to sport. This research prize commemorates the founder chairman of the ICSPE, the British politician Mr. Philip Noel Baker, who was an Olympic finalist in the 1920 Games held at Antwerp, and a Nobel prize-winner in 1959. The 1982 award was made to Prof. Mik Ostyn, Head of the Dept. of Physiology, Catholic University of Leuven (Louvaine), Belgium, for his services to sports medicine, and for the organisation of several symposia at the Institute of Physical Education in Heverlee. These included the 1975 symposium on History of Physical Education and Sport; Kinanthropometry in 1978 and Research into Physical Fitness in 1980.

The presentation was made by the present chairman of ICSPE, Prof. Ernst Jokl of Lexington, Kentucky on March 29th, at the Faculty Club of the University, in the presence of the Rector and Vice-Rector and other distinguished members of the University and of the Institute of Physical Education.

We send our congratulations to Professor Ostyn, an overseas member of BASM, who negotiated reciprocal membership with the Belgian Society of Sports Medicine and Physical Education. Prof. Ernst Jokl is an honorary life member of our Association. We are grateful to Dr. Bart Vanden Eynde of Leuven University for supplying this information about his departmental head.

**H. E. Robson**